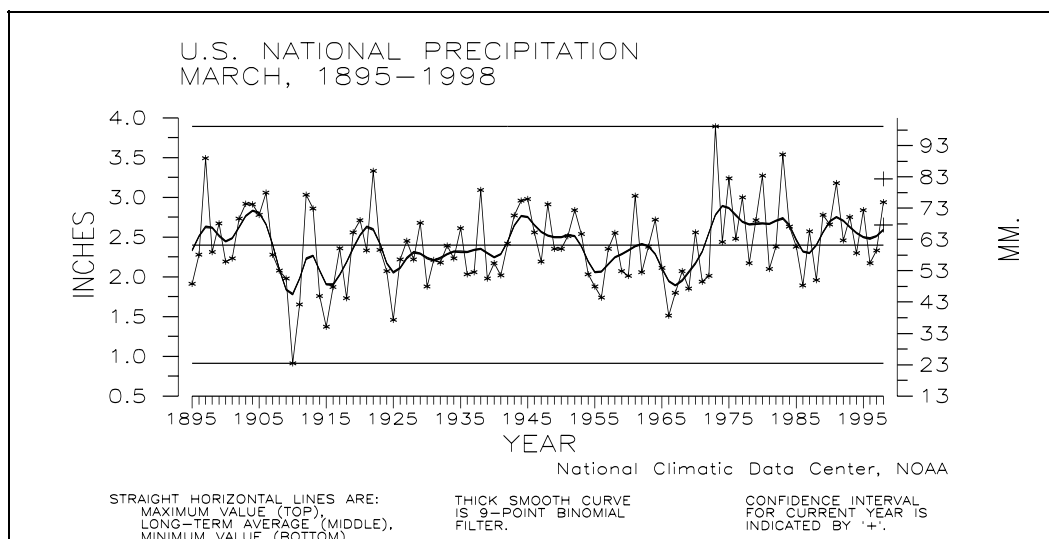
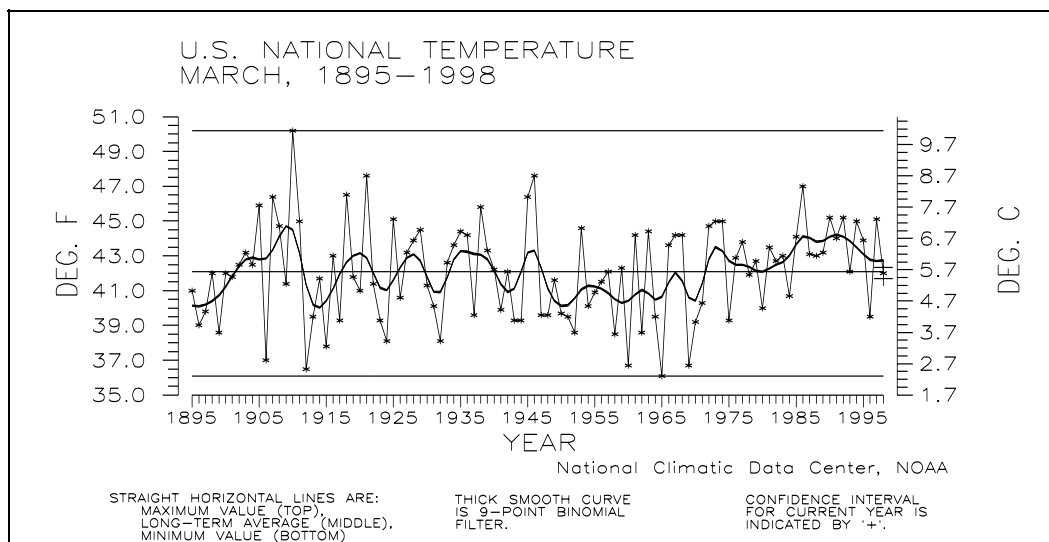


# CLIMATE VARIATIONS BULLETIN



This CLIMATE VARIATIONS BULLETIN (CVB) is a preliminary report that puts current monthly climate anomalies into historical perspective using climate databases archived at the National Climatic Data Center (NCDC). It is issued on a monthly basis. Supplemental sections are included which address seasonal and annual perspectives, when appropriate.

Current data are based on preliminary reports from River Forecast Center stations and First and Second Order airport stations obtained from the National Weather Service (NWS) Climate Prediction Center (formerly, Climate Analysis Center), and preliminary tornado statistics obtained from the NWS National Severe Storms Forecast Center. **THE CURRENT DATA SHOULD BE USED WITH CAUTION.** These preliminary data are useful for estimating how current anomalies compare to the historical record, however the actual values and rankings for the current year will change as the final data arrive at NCDC and are processed.

The following NCDC datasets are used for the historical data: the climate division drought database (TD-9640), the hurricane datasets (TD-9636 and TD-9697), the tornado dataset (STORM DATA), and the monthly station dataset (LCD supplemental files). It should be noted that the climate division drought database consists of monthly data for 344 climate divisions in the contiguous United States. These divisional values are calculated from the 6000+ station Cooperative Observer network.

If you are a climate researcher and would like to order copies of the historical datasets used to make graphs of the type in this report, call 828-271-4994 or fax a letter to 828-271-4876 or mail a letter to the address given below, ATTN: Research User Services.

All other questions or requests for data should be made by calling 828-271-4800 or sending a fax to 828-271-4876 or by writing to:

National Climatic Data Center, NOAA  
Federal Building  
151 Patton Avenue, Room 120  
Asheville, NC 28801-5001

If you use any of the information from this CVB, please identify "National Climatic Data Center, NOAA" as the source.

# UNITED STATES MARCH CLIMATE IN HISTORICAL PERSPECTIVE

William O. Brown  
Alan Basist  
National Climatic Data Center, NOAA  
Global Climate Lab  
Federal Building  
Asheville, NC 28801 USA

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- Table 2. Regional and National Extremes, 1961-1990 Normals, and 1998 Values for March
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- Figure 18. Southeast Region Precipitation, Normal and Departure from Normal, April 1997-March 1998

**TABLE 1.** PRECIPITATION AND TEMPERATURE RANKS, BASED  
ON THE PERIOD 1895-1998. 1 = DRIEST/COLDEST,  
104 = WETTEST/WARMEST FOR MARCH 1998,  
104 = WETTEST/WARMEST FOR FEB-MAR 1998,  
103 = WETTEST/WARMEST FOR OCT 1997-MAR 1998,  
103 = WETTEST/WARMEST FOR APR 1997-MAR 1998.

REGION	MAR 1998	FEB-MAR 1998	OCT 1997- MAR 1998	APR 1997- MAR 1998
-----	----	-----	-----	-----
PRECIPITATION:				
NORTHEAST	60	75	60	37
EAST NORTH CENTRAL	101	101	63	42
CENTRAL	65	61	27	31
SOUTHEAST	82	100	103	100
WEST NORTH CENTRAL	89	96	91	83
SOUTH	82	83	91	93
SOUTHWEST	74	93	68	93
NORTHWEST	55	58	40	77
WEST	76	101	102	101
NATIONAL	90	101	97	98
TEMPERATURE:				
NORTHEAST	91	104	96	74
EAST NORTH CENTRAL	69	103	103	95
CENTRAL	57	96	87	43
SOUTHEAST	33	51	48	16
WEST NORTH CENTRAL	40	86	96	86
SOUTH	29	59	54	26
SOUTHWEST	48	49	61	70
NORTHWEST	73	85	93	95
WEST	58	53	75	91
NATIONAL	48	87	96	78

**TABLE 2.** EXTREMES, 1961-90 NORMALS, AND 1998 VALUES FOR MARCH. IT SHOULD BE NOTED THAT THE 1998 VALUES WILL CHANGE WHEN THE FINAL DATA ARE PROCESSED.

REGION	PRECIPITATION (INCHES)				NORMAL PCPN	1998 PCPN
	DRIEST VALUE	YEAR	WETTEST VALUE	YEAR		
NORTHEAST	.71	1915	6.56	1936	3.14	3.43
EAST NORTH CENTRAL	.21	1910	3.50	1977	1.89	3.15
CENTRAL	.55	1910	6.91	1897	3.92	4.16
SOUTHEAST	1.54	1910	8.89	1980	4.75	5.86
WEST NORTH CENTRAL	.39	1994	2.10	1987	1.02	1.23
SOUTH	.89	1966	6.28	1973	2.83	3.30
SOUTHWEST	.20	1956	2.90	1905	1.02	1.29
NORTHWEST	.58	1965	5.46	1904	2.72	2.60
WEST	.09	1914	6.28	1907	2.23	2.97
NATIONAL	.91	1910	3.89	1973	2.47	2.94*

\* PRELIMINARY VALUE, CONFIDENCE  
INTERVAL + OR - .29 INCHES

REGION	TEMPERATURE (DEGREES F)				NORMAL TEMP	1998 TEMP
	COLDEST VALUE	YEAR	WARMEST VALUE	YEAR		
NORTHEAST	25.1	1916	42.5	1946	33.4	36.7
EAST NORTH CENTRAL	18.8	1960	42.2	1910	29.9	31.2
CENTRAL	29.0	1960	53.0	1946	43.0	43.1
SOUTHEAST	44.9	1960	63.2	1945	54.7	53.3
WEST NORTH CENTRAL	19.1	1965	43.4	1910	31.2	29.1
SOUTH	43.7	1915	62.6	1907	53.6	51.8
SOUTHWEST	35.6	1917	49.0	1910	41.9	41.6
NORTHWEST	31.0	1917	46.0	1934	38.6	40.2
WEST	39.5	1897	55.0	1934	46.3	46.8
NATIONAL	36.1	1965	50.2	1910	42.4	42.0*

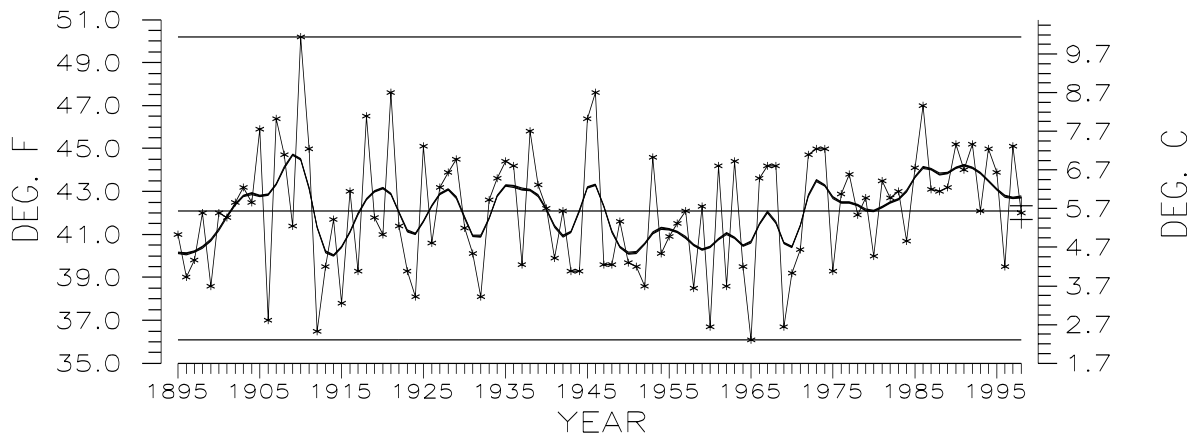
\* PRELIMINARY VALUE, CONFIDENCE  
INTERVAL + OR - .3 DEG. F.

**TABLE 3.**

STATISTICS FOR SELECTED RIVER BASINS: PRECIPITATION RANKING FOR OCT-MAR 1997-98, WHERE RANK OF 1 = DRIEST, 103 = WETTEST, BASED ON THE PERIOD 1895 TO 1998, AREAL PERCENT OF THE BASIN EXPERIENCING SEVERE OR EXTREME LONG-TERM (PALMER) DROUGHT, AND AREAL PERCENT OF THE BASIN EXPERIENCING SEVERE OR EXTREME LONG-TERM (PALMER) WET CONDITIONS, AS OF MARCH 1998. RIVER BASIN REGIONS AS DEFINED BY THE U.S. WATER RESOURCES COUNCIL.

RIVER BASIN -----	PRECIPITATION RANK -----	% AREA DRY -----	% AREA WET -----
MISSOURI BASIN	96	.0%	40.6%
PACIFIC NORTHWEST BASIN	40	4.6%	11.2%
CALIFORNIA RIVER BASIN	98	.0%	95.8%
GREAT BASIN	74	.0%	30.6%
UPPER COLORADO BASIN	22	.0%	.0%
LOWER COLORADO BASIN	79	.0%	7.9%
RIO GRANDE BASIN	74	.0%	8.8%
ARKANSAS-WHITE-RED BASIN	99	.0%	56.8%
TEXAS GULF COAST BASIN	87	.0%	29.7%
SOURIS-RED-RAINY BASIN	73	.0%	29.3%
UPPER MISSISSIPPI BASIN	76	.0%	3.4%
LOWER MISSISSIPPI BASIN	65	.0%	.0%
GREAT LAKES BASIN	47	.0%	15.2%
OHIO RIVER BASIN	13	.0%	.0%
TENNESSEE RIVER BASIN	33	.0%	.0%
NEW ENGLAND BASIN	38	.0%	7.7%
MID-ATLANTIC BASIN	84	.0%	19.6%
SOUTH ATLANTIC-GULF BASIN	103	.0%	46.3%

# U.S. NATIONAL TEMPERATURE MARCH, 1895–1998



National Climatic Data Center, NOAA

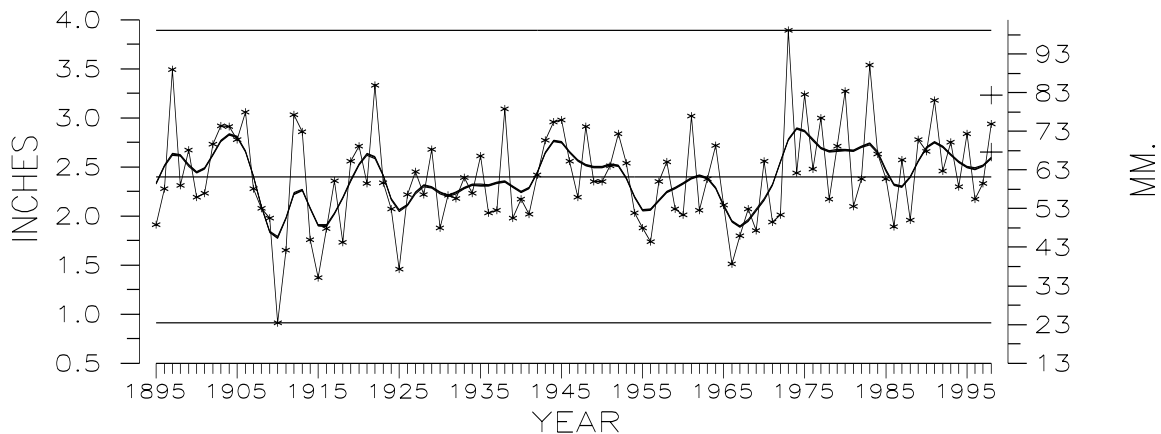
STRAIGHT HORIZONTAL LINES ARE:  
MAXIMUM VALUE (TOP),  
LONG-TERM AVERAGE (MIDDLE),  
MINIMUM VALUE (BOTTOM)

THICK SMOOTH CURVE  
IS 9-POINT BINOMIAL  
FILTER.

CONFIDENCE INTERVAL  
FOR CURRENT YEAR IS  
INDICATED BY '+',

Figure 1: Preliminary data for March 1998 indicate that temperature averaged across the contiguous United States was at the long-term mean ranking as the 48th coolest March since 1895. One percent of the country was much warmer than normal while none of the country was much cooler than normal.

# U.S. NATIONAL PRECIPITATION MARCH, 1895–1998



National Climatic Data Center, NOAA

STRAIGHT HORIZONTAL LINES ARE:  
MAXIMUM VALUE (TOP),  
LONG-TERM AVERAGE (MIDDLE),  
MINIMUM VALUE (BOTTOM)

THICK SMOOTH CURVE  
IS 9-POINT BINOMIAL  
FILTER.

CONFIDENCE INTERVAL  
FOR CURRENT YEAR IS  
INDICATED BY '+',

Figure 2: Preliminary precipitation data indicate that March 1998 was the 15th wettest such month since 1895. Over 15% of the country experienced much wetter than normal conditions while about one percent of the country was much drier than normal.

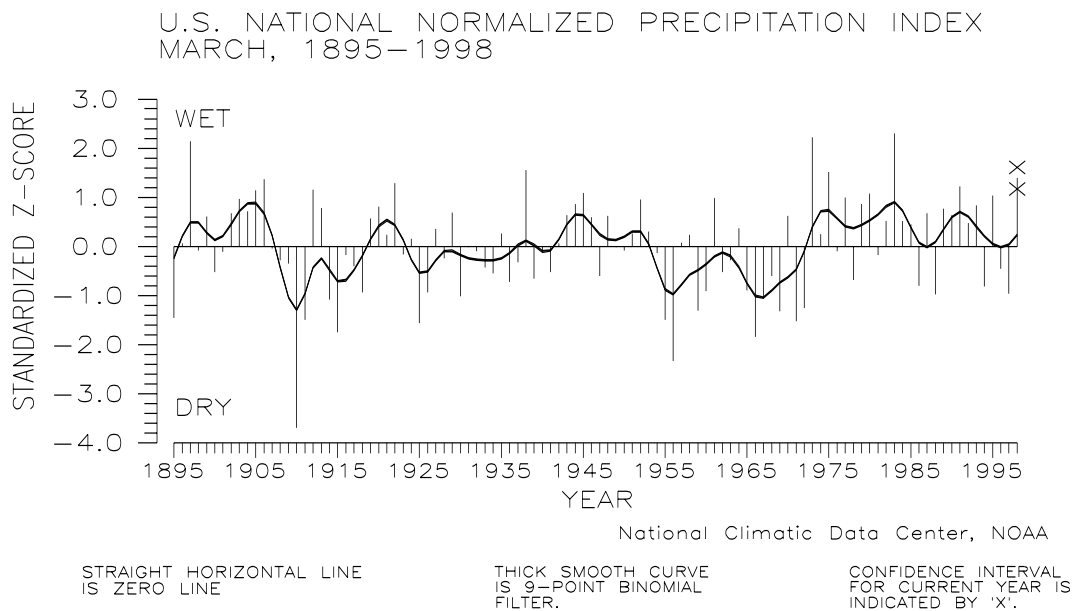


Figure 3: The preliminary national standardized precipitation index ranked March 1998 as the sixth wettest such month on record. This standardized z-score is estimated to be accurate to within 0.222 index units and its confidence interval is shown as an 'X'.

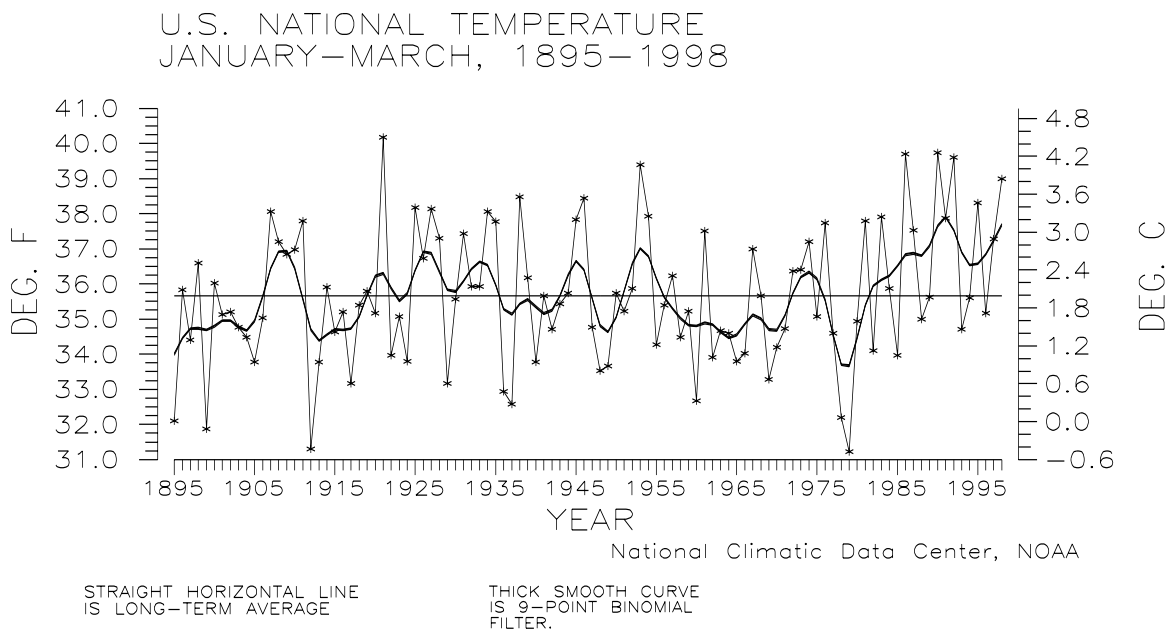
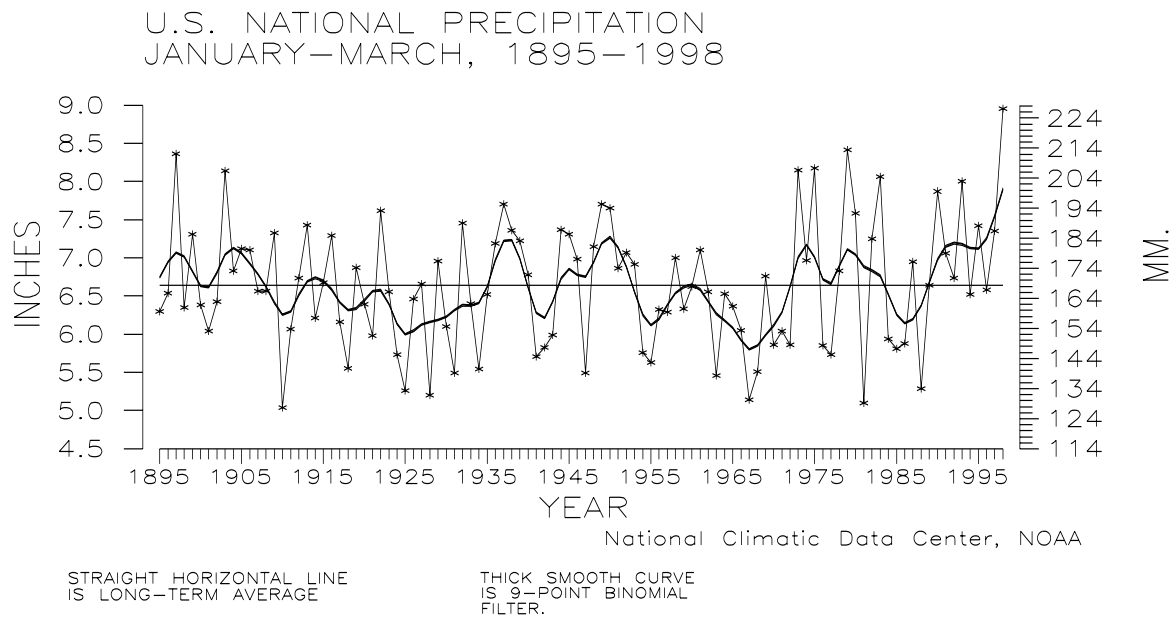
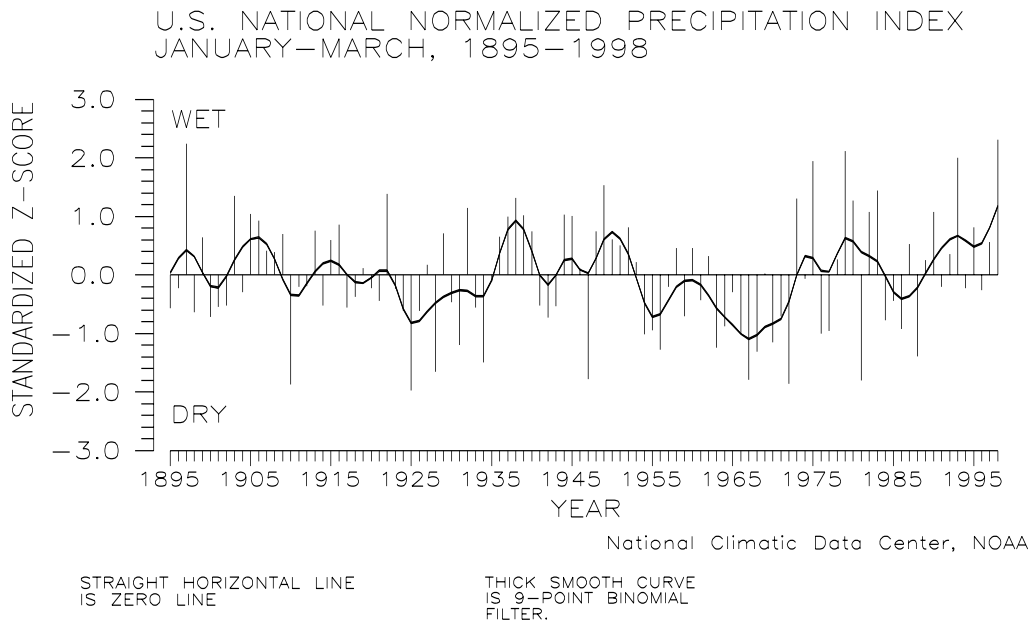


Figure 4: Based upon preliminary data, January-March 1998 was the sixth warmest such period on record. Thirty-one percent of the country had much warmer than normal January-March temperatures while none of the country was much cooler than normal.





**Figure 5:** Preliminary precipitation data indicate that the year-to-date, January-March 1998, was the wettest such three-month period since records began. About 35% of the country was much wetter than normal while none of the country was much drier than normal.



**Figure 6:** The preliminary national year-to-date standardized precipitation index ranked January-March 1998 as the wettest such period since 1895.

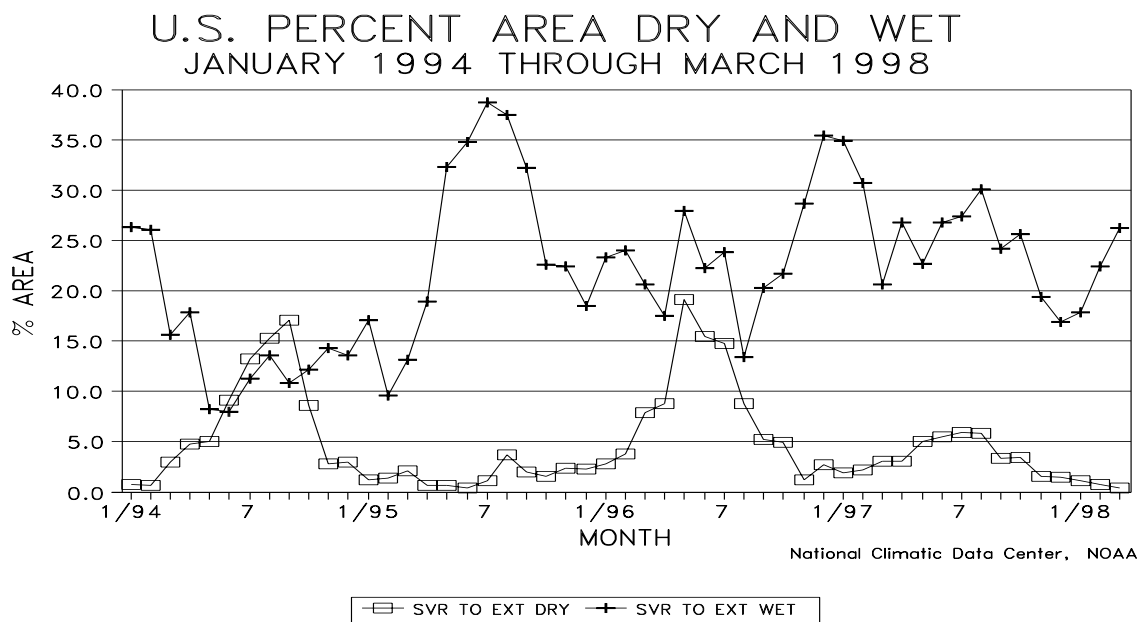


Figure 7: Long-term drought coverage (as measured by the Palmer Drought Index) remained nearly steady during March 1998 with less than one percent of the country experiencing severe to extreme drought and greater than 26% of the country experiencing severe to extreme wetness by the end of the month. Core wet areas included California, the southern Plains, the Southeast, and portions of the central and northern Rockies. Only portions of eastern Oregon were severely dry.

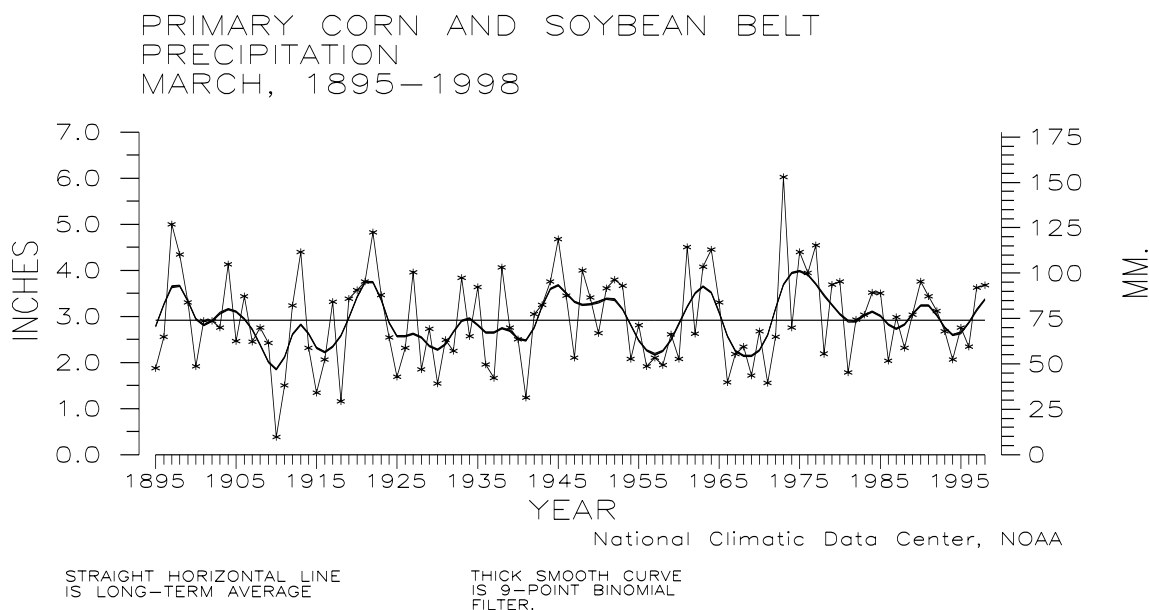


Figure 8: The first month of the growing season for the Primary Corn and Soybean Belt was slightly wetter than normal.

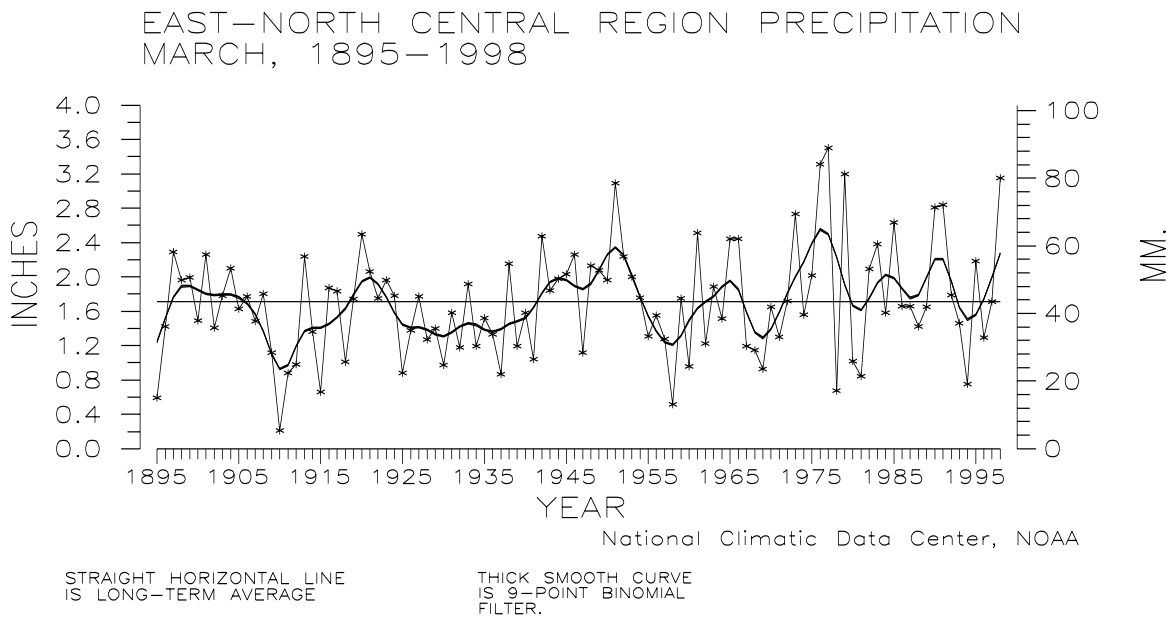


Figure 9: Based upon preliminary data, March 1998 was the fourth wettest such month since 1895 for the East-North Central Region. This region includes Iowa, Michigan, Minnesota, and Wisconsin.

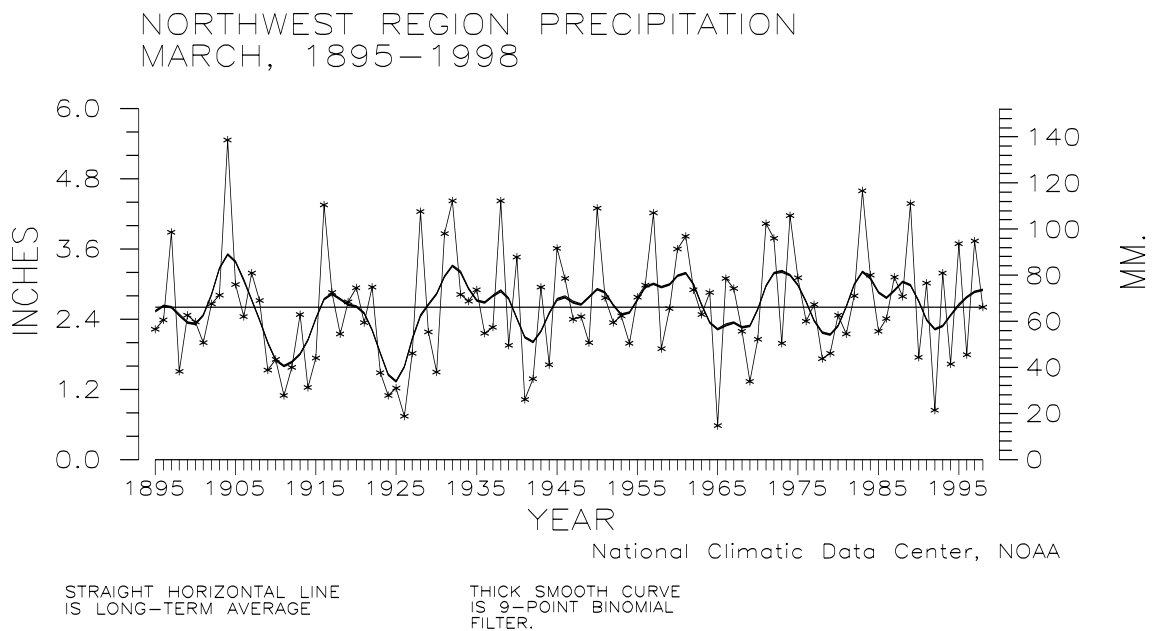


Figure 10: Based upon preliminary data, March 1998 was the 50th wettest such period on record for the Northwest Region. This Region includes Idaho, Oregon, and Washington.

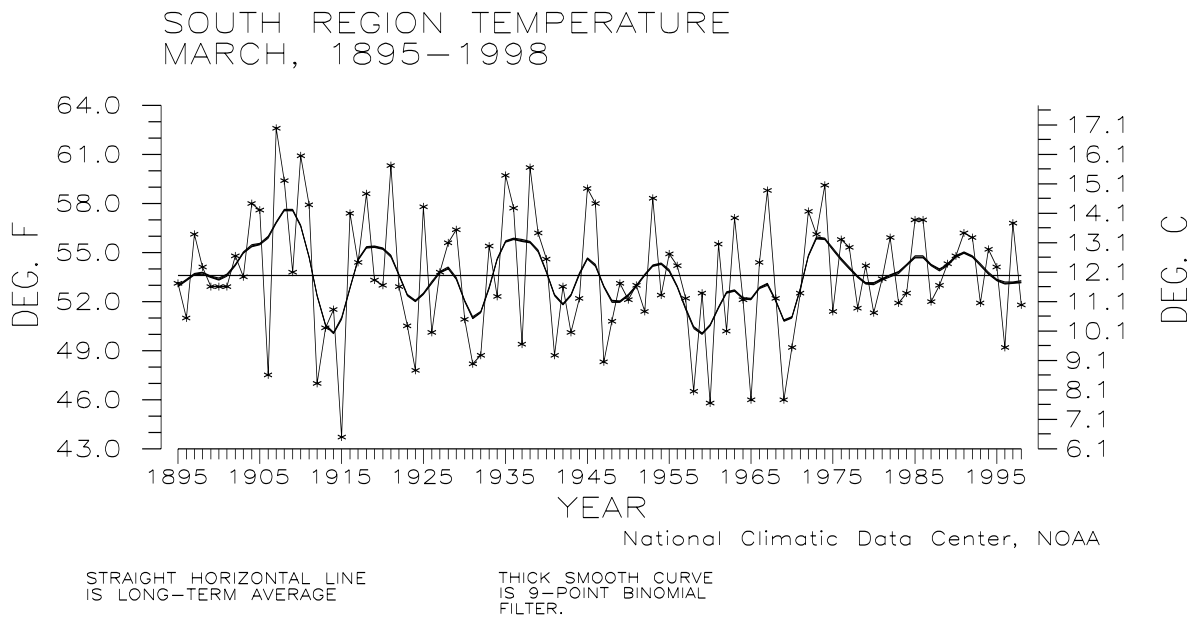


Figure 11: Preliminary temperature data indicate that March 1998 was the 29th coolest such month on record for the South Region. This region includes Arkansas, Louisiana, Mississippi, Oklahoma, and Texas.

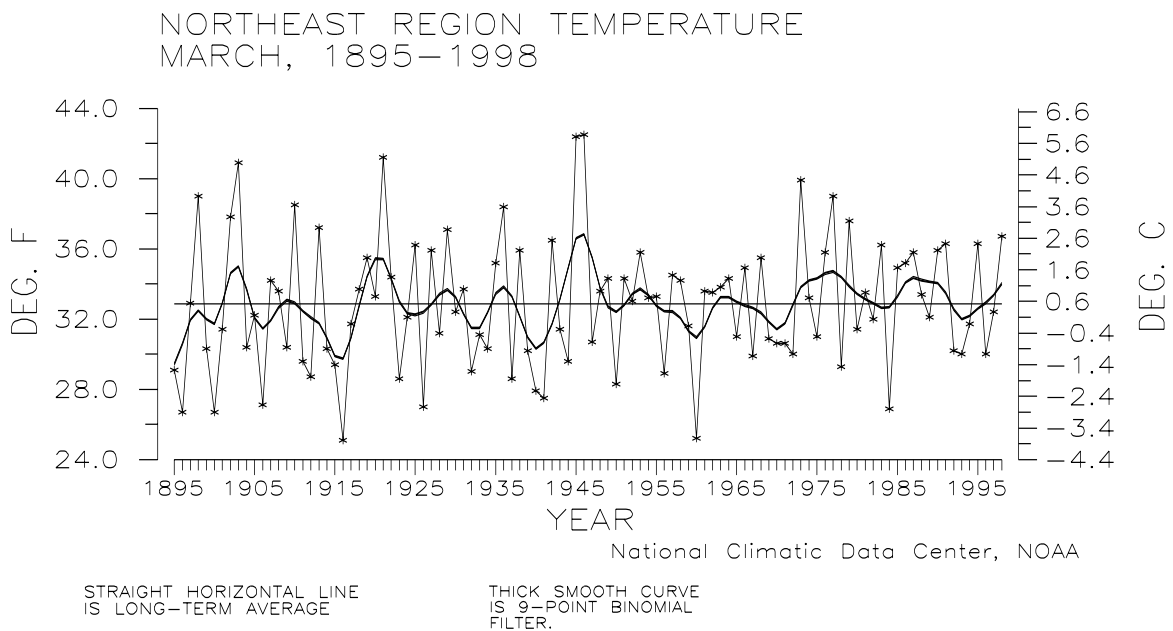
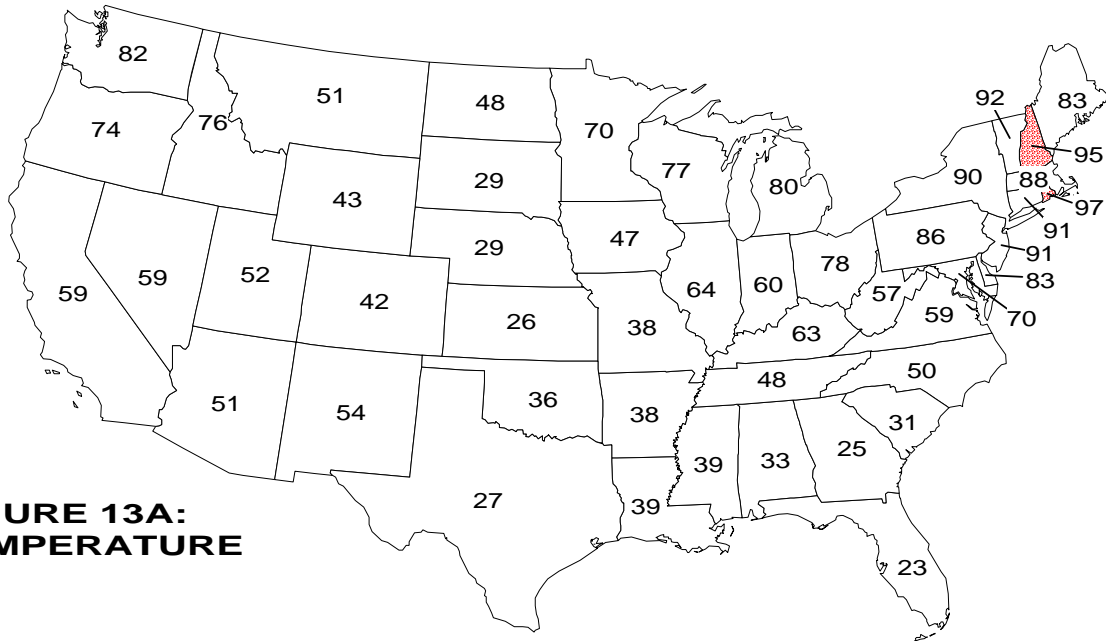
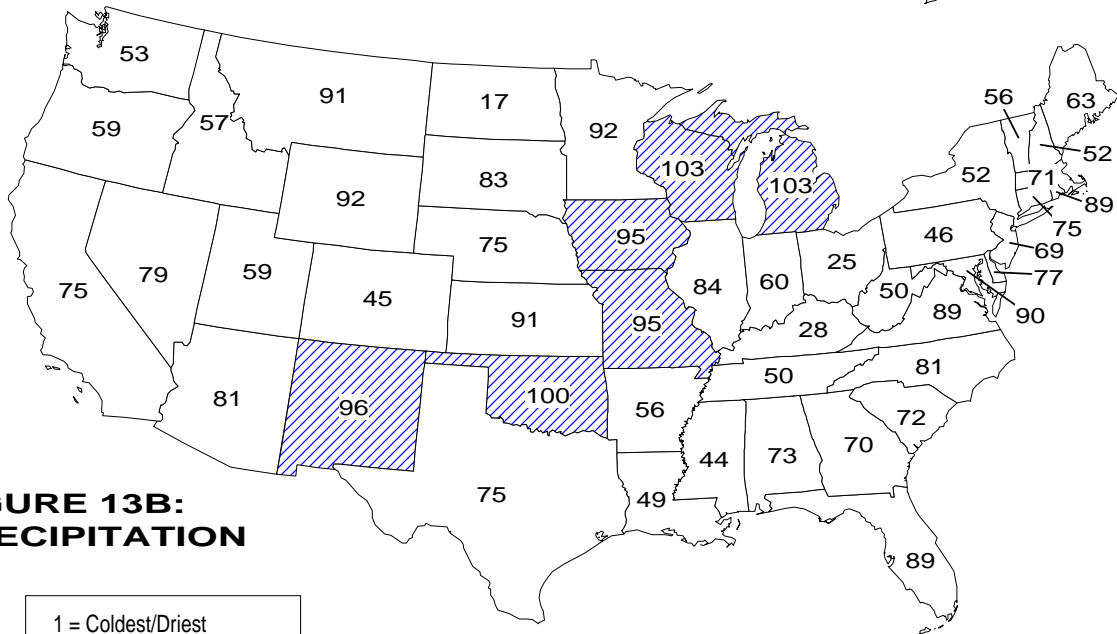


Figure 12: Based upon preliminary data, March 1998 was the 14th warmest such period on record for the Northeast Region. The Northeast Region includes Pennsylvania, Maryland, Delaware, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine.

## MARCH 1998 STATEWIDE RANKS



**FIGURE 13A:  
TEMPERATURE**



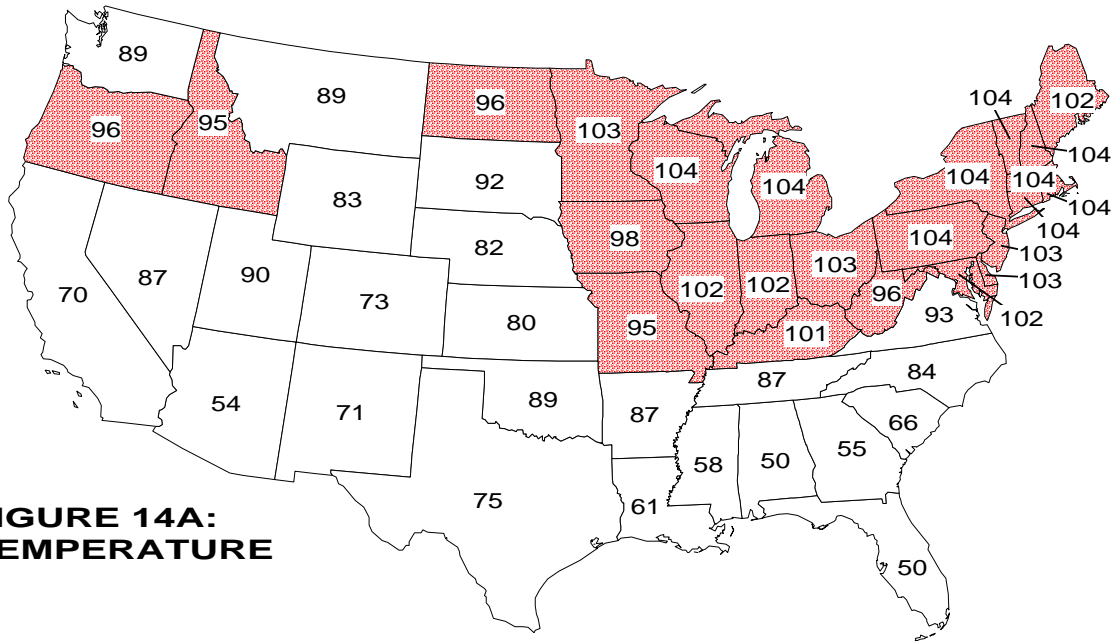
**FIGURE 13B:  
PRECIPITATION**

1 = Coldest/Driest  
104 = Warmest/Wettest

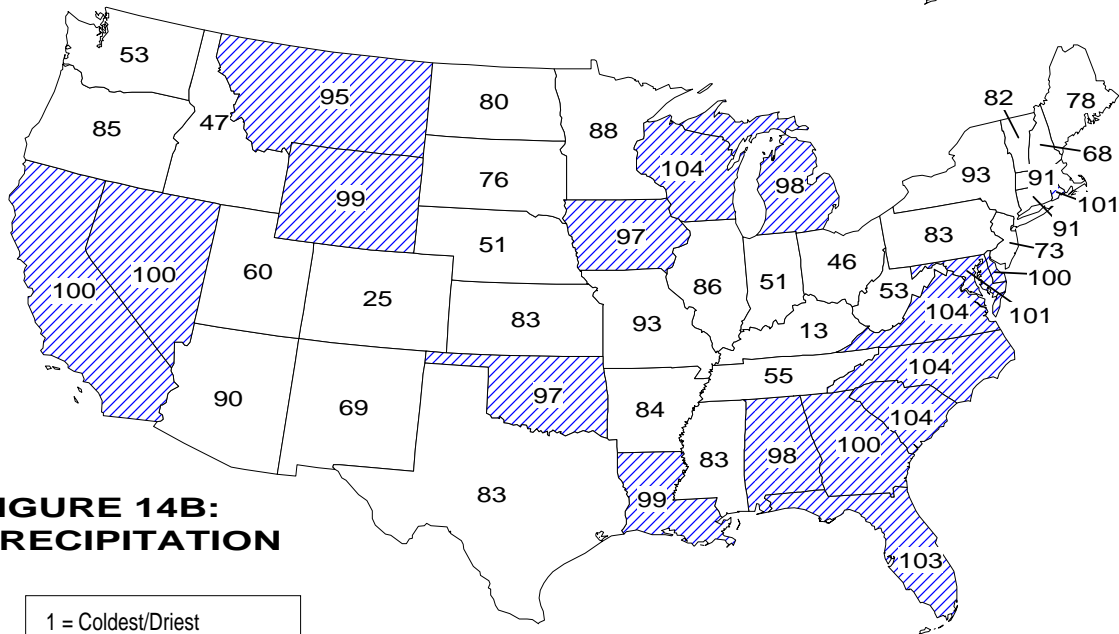
National Climatic Data Center, NOAA

Temperature and Precipitation Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1998. States having a rank of top ten coldest or driest (rank 1-10) or top ten warmest or wettest (rank 95-104) are shaded.

## JAN-MAR 1998 STATEWIDE RANKS



**FIGURE 14A:  
TEMPERATURE**



**FIGURE 14B:  
PRECIPITATION**

1 = Coldest/Driest  
104 = Warmest/Wettest

National Climatic Data Center, NOAA

Temperature and Precipitation Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1998. States having a rank of top ten coldest or driest (rank 1-10) or top ten warmest or wettest (rank 95-104) are shaded.

SSMI MEAN TEMP. ANOMALY IN CELSIUS MAR. 1998  
(SNOW COVER WITHIN OR NORTH OF 15% CONTOUR)

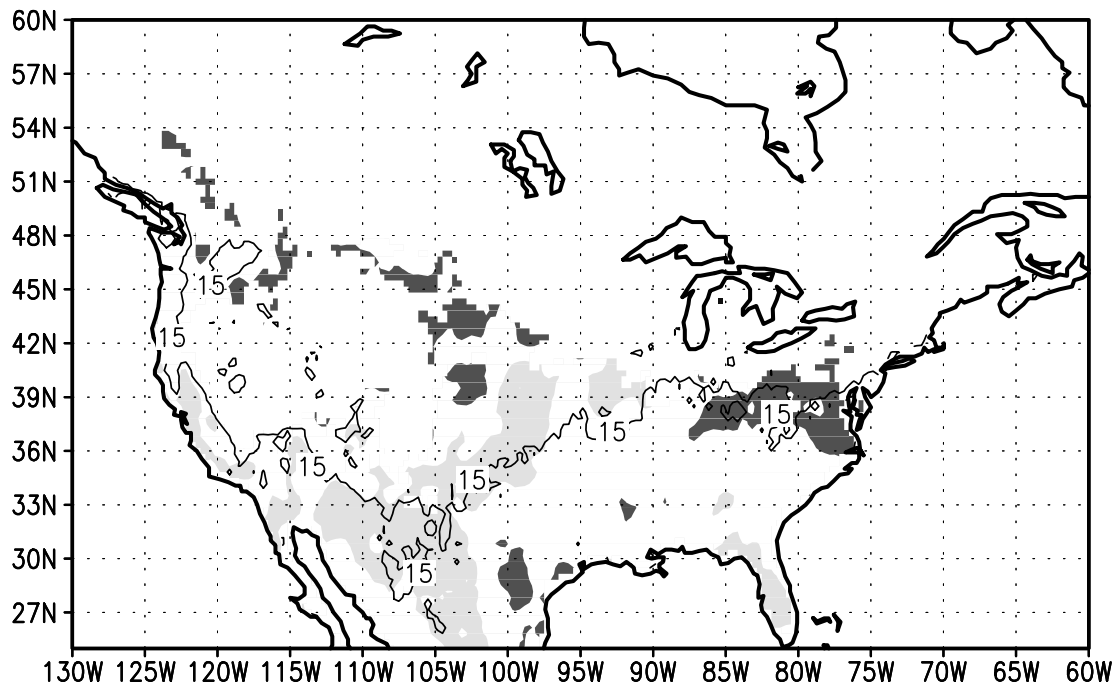


Figure 15

SNOW COVER ANOMALY (%) MAR. 1998

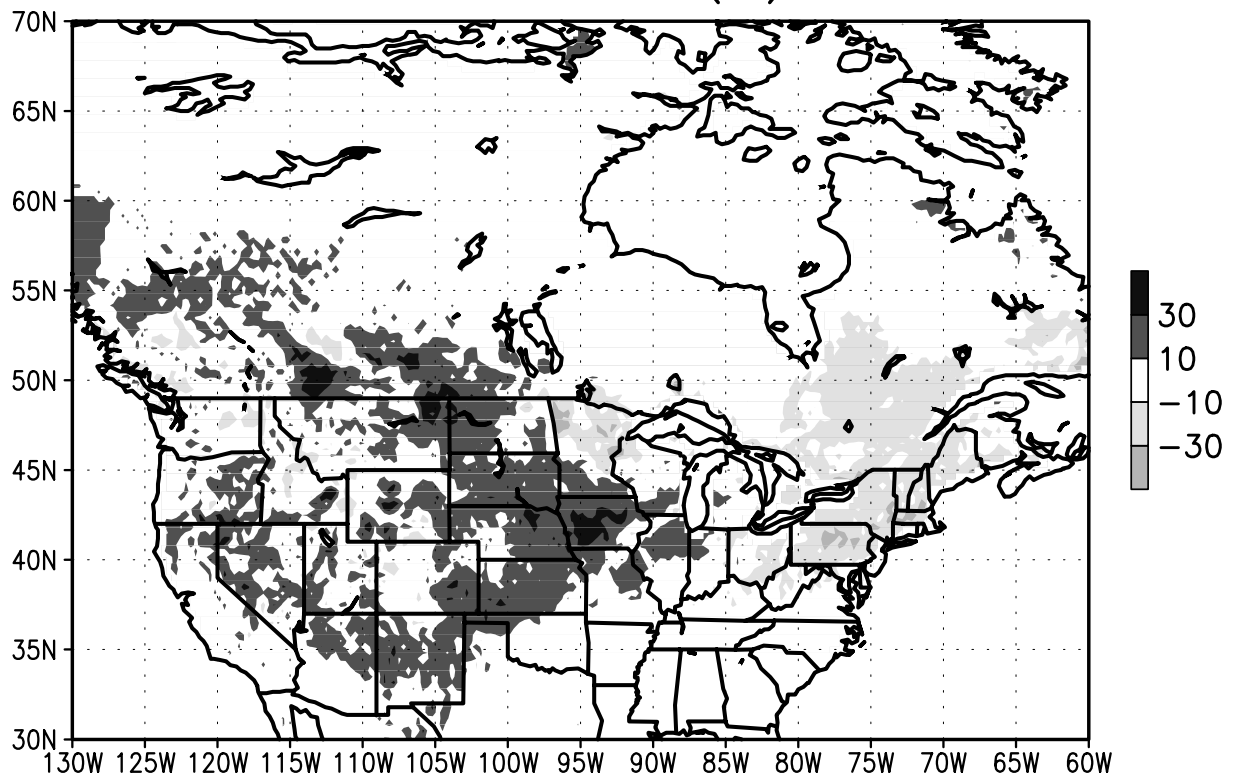


Figure 16

**Figure 13A** shows, in illustrative map form, the March 1998 temperature rankings for the 48 contiguous states. No state was within the top ten cool portion of the historical distribution while eight were within the cool third of the historical distribution. Two states ranked within the top ten warm portion of the historical distribution while 18 ranked within the warm third of the distribution.

March 1998 state ranks for precipitation are shown in **Figure 13B**. Six states ranked within the top ten wet portion of the distribution while 23 others ranked within the wet third portion of the distribution. No state ranked within the top ten dry portion of the historical distribution while three others ranked within the dry third. ***It should be noted that these March state precipitation ranks are preliminary and should be used with considerable caution due to the high variability of precipitation on a small space and time scale.***

Year-to-date statewide temperature and precipitation ranks are shown in **Figures 14A and 14B**. Twenty-four states ranked within the top ten warm portion of the historical distribution while 17 others ranked within the warm third of the distribution. The year-to-date was the warmest such period on record for Connecticut, Massachusetts, Michigan, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin. The January-March period was the second warmest such period on record for Delaware, Minnesota, New Jersey, and Ohio. No state was within the top ten cool or the cool third of the historical distribution. It was the wettest January-March period on record for North Carolina, South Carolina, Virginia, and Wisconsin. Fourteen other states ranked within the top ten wet portion of the distribution. Only two states ranked within the dry third of the distribution.

**Figure 15** shows the mean monthly temperature anomalies for the month of March 1998. The base period is seven years (1992-98). This experimental product is derived from the Special Sensor Microwave Imager (SSM/I), an instrument flown on a polar orbiting satellite of the defense meteorological satellite program. The anomalies are in degrees Celsius. Above normal temperatures covered parts of the mid-Atlantic states, where the sub-tropical high persisted during much of the month. Temperatures were also above average over southeastern Texas, the lower Mississippi valley, and leeward of the northern Rocky Mountains, due to the absence of major cold air from Canada. Cold temperature anomalies occurred along the west coast and in Florida where there was persistent cloud cover. It was also colder than normal over the central Plains states and the southwestern states, where the storm track brought above normal snow cover. Due to persistent snow cover, the satellite is unable to identify temperature anomalies over a portion of the country in March. This area is displayed on the map as being within or north of the 15% contour. See the snow cover map for more detail of the snow cover. The full and anomalous fields for temperature, surface and snow cover for both North America and the globe can be viewed on the web for greater details at: <http://www.ncdc.noaa.gov/plwebapps/plsql/ssmimain>.

**Figure 16** shows the mean monthly snow cover anomalies for March 1998. Values represent the deviation from average (base period 1992-1998) snow cover. The anomaly represents the percentage of the month that snow cover was above/below the monthly average. This product is derived from the SSM/I. Much of the central and northern Plains and southwestern states had above normal snow cover, due to the active subtropical jet bringing Pacific moisture into the region. In contrast, subtropical high pressure dominated the eastern third of the country, causing the snow pack over the northeastern states to melt away earlier than normal. The full and anomalous snow cover fields can be viewed for North America and the globe on the web at: <http://www.ncdc.noaa.gov/plwebapps/plsql/ssmimain>.



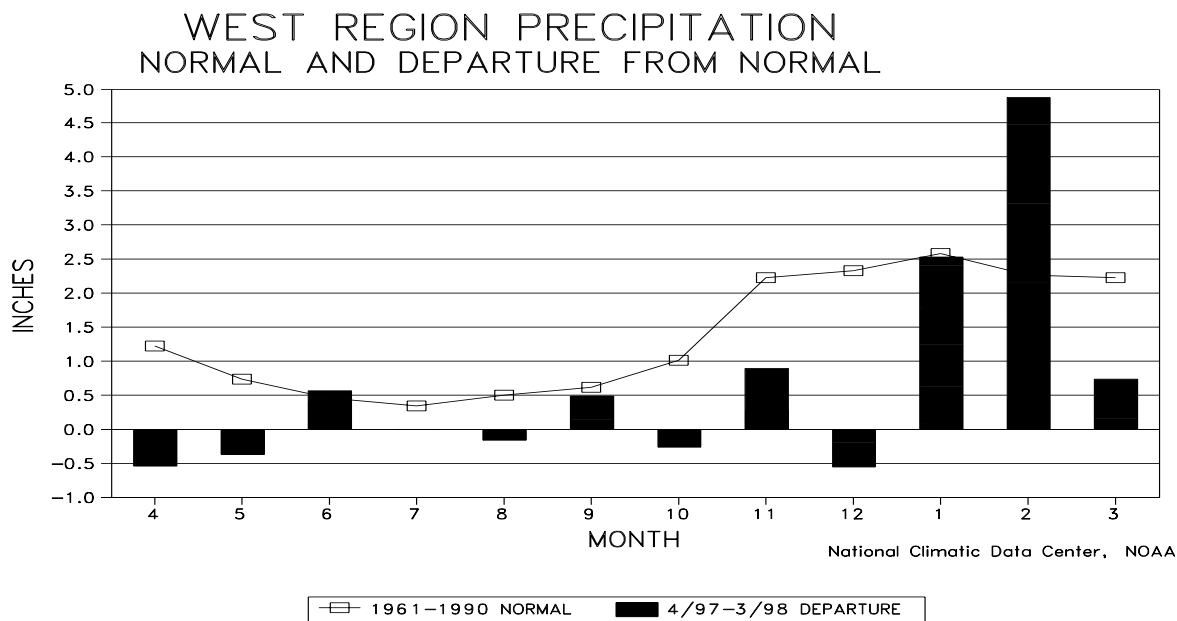


Figure 17: Precipitation for the West Region has been above normal for each of the last three months and for six of the last twelve months. Past El Nino episodes have provided wetter than normal conditions for this part of the country. The West Region includes California and Nevada.

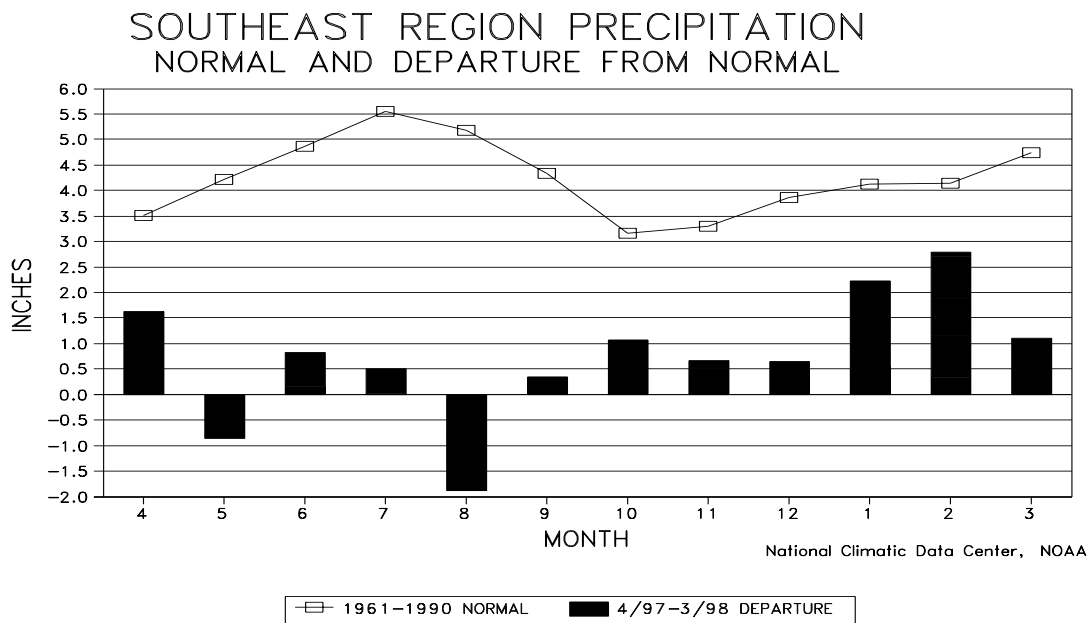


Figure 18: Ten of the last twelve months have been wetter than normal for the Southeast Region including each of the last seven months. The teleconnections and subtropical jets associated with the present El Nino had a direct impact on the above normal precipitation in the Southeast beginning in the Fall and persisting through March.